Biological Forum – An International Journal **14(4a): 822-825(2022)**

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Vaselife Studies of Cut Foliages of *Murraya exotica*

Ruchita Panda[1*], Siddharth Kumar Palai[1], Sashikala Beura[1], Pradyumna Tripathy[2], Prasanna Kumar Samant[3] and Sadhna Swastika[1]
[1]Department of Floriculture and Landscaping, College of Agriculture, OUAT, Bhubaneswar (Odisha), India.
[2]Department of Vegetable Science, College of Agriculture, OUAT, Bhubaneswar (Odisha), India.
[3]OIC, AICRP on LTFE, OUAT, Bhubaneswar (Odisha), India.

(Corresponding author: Ruchita Panda)*
(Received 19 August 2022, Accepted 18 October, 2022)
(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: The experiment was conducted to study the vase life of *Murraya exotica* cut foliages by using different pulsing, holding solutions. Factorial CRD design was followed in the experiment. Effect of pulsing, holding solutions and distilled water (control) on different modules was studied in *Murraya exotica* cut foliages. Cut foliages of six modules comprising of different spacing, pit size, FYM, basal fertilizer dose, water soluble fertilizers and growth regulator (BAP) were examined for the vase life studies. Pulsing solution containing Sucrose (2%) + $Al_2(SO_4)_3$ (1000 ppm) (11.62 days) resulted long vase life of foliage followed by solution containing Sucrose (2%) + BA (50 ppm) (10.83 days) in module VI. Whereas holding solution containing Sodium Benzoate (150 ppm) (10.74 days) showed long vase life of foliage followed by Sodium Benzoate (100ppm) (10.57 days) in module VI.

Keywords: *Murraya exotica*, cut foliages, pulsing solution, holding solution, Sodium Benzoate, Sucrose.

INTRODUCTION

Murraya is one of the 150 genera from the family Rutaceae. The genus Murraya was named after John Andrew Murray, a Swedish botanist and a professor of Medicine and Botany, in the University of Gottingen. *Murraya exotica* is geographically the most wide-spread species of section Murraya. This species grows from nearly sea level to an elevation of 1500 m and native to continental tropical Asia (Matu, 2011). Of the 14 global species belonging to this genus, only three species *i.e*. *Murraya koenigii*, *Murraya paniculata* and *Murraya exotica* are found in India. *Murraya exotica* is commonly known as Orange Jasmine, Mock Orange, Satin Wood, Honey Bush, Kamini, China Box and Cafe de la India. It is distributed over the greater part of India and the Andaman Islands.

Murraya exotica, an evergreen shrub, usually 2 to 3 m in height but reaching up to 7.5 m. The leaves are alternately arranged along the stems and borne on stalks. These leaves (6-11.5 cm long) are once-compound (*i.e.* pinnate) with 3-9 leaflets. The glossy leaflets (1.5-7 cm long and 1.2-3 cm wide) are narrowly elliptical to somewhat ovoid-shaped in outline. The fragrant flowers are borne in clusters, containing up to eight flowers, at the tips of the branches. Each flower has five green sepals and five white petals (10-18 mm long) that are curved backwards.

Along with the fragrant flowers, cut foliages are also in demand throughout the year and comprise 10% of world floriculture trade with an annual growth rate of 4% (Nair *et al.*, 2017). Cut foliages are used as fillers along with flowers in bouquets, floral arrangements to create variability in colours, textures, shapes and forms. Cut foliages are kept in pulsing and holding solutions to improve the water uptake by reducing the vascular blockage and ultimately enhancing the vase life.

MATERIALS AND METHODS

The freshly harvested twigs were used for the vase life studies by keeping them in distilled water (control) and different pulsing, holding solutions following factorial CRD design. Three twigs were taken in each replication and the vase life of the twigs is expressed in days. This was determined by counting the days from putting the twigs in a vase solution till it retains its appearance in a vase. The details of chemicals used in pulsing and holding solutions are given in Table 1.

Table 1: Treatment details of vase life studies of cut foliage.

	Pulsing solutions		Holding solutions
T_1	BA (25ppm)	T_1	NaOCl (25ppm)
T_2	BA (50ppm)	T_2	NaOCl (50ppm)
T_3	GA_3 (25ppm)	T_3	$Al_2(SO_4)_3$ (200ppm)
T_4	GA_3 (50ppm)	T_4	$Al_2(SO_4)_3$ (300ppm)
T_5	8-HQS (100ppm)	T_5	Citric acid (200ppm)
T_6	8-HQS (200ppm)	T_6	Citric acid (300ppm)
T_7	$Al_2(SO_4)_3$ (100ppm)	T_7	Sodium Benzoate (100ppm)
T_8	Al_2 $(SO_4)_3$ (200ppm)	T_8	Sodium Benzoate (150ppm)
T_9	NaOCl (50ppm)	T_9	Sucrose (2%) + NaOCl (25ppm)
T_{10}	NaOCl (100ppm)	T_{10}	Sucrose (2%) + NaOCl (50ppm)
T_{11}	Sucrose (2%) + BA (25ppm)	T_{11}	Sucrose (2%) + $Al_2(SO_4)_3$ (200ppm)
T_{12}	Sucrose (2%) + BA (50ppm)	T_{12}	Sucrose (2%) + $Al_2(SO_4)_3$ (300ppm)
T_{13}	Sucrose (2%) + GA_3 (25ppm)	T_{13}	Sucrose (2%) + Citric acid (200ppm)
T_{14}	Sucrose (2%) + GA_3 (50ppm)	T_{14}	Sucrose (2%) + Citric acid (300ppm)
T_{15}	Sucrose (2%) + 8-HQS (100ppm)	T_{15}	Sucrose (2%) + Sodium Benzoate (100ppm)
T_{16}	Sucrose (2%) + 8-HQS (200ppm)	T_{16}	Sucrose (2%) + Sodium Benzoate (150ppm)
T_{17}	Sucrose (2%) + $Al_2(SO_4)_3$ (100ppm)	T_{17}	Sucrose (2%)
T_{18}	Sucrose (2%) + $Al_2(SO_4)_3$ (200ppm)	T_{18}	Control (Distilled water)
T_{19}	Sucrose (2%) + NaOCl (50ppm)		
T_{20}	Sucrose (2%) + NaOCl (100ppm)		
T_{21}	Sucrose (2%)		
T_{22}	Control (Distilled water)		

RESULT

Pulsing solutions. Vase life of *Murraya* was significantly influenced by the pulsing treatments (A), but non-significant with modules (B) and interactions (AxB) (Table 2).

Among the different modules the longest vase life (10.19 days) of leaves was recorded in Module VI followed by Module V (10.11 days) and shortest in Module I (9.47 days).

The longest vase life (11.62 days) was recorded in T_{18} (Sucrose (2%) + $Al_2(SO_4)_3$@ 200ppm) followed by T_{12} (Sucrose (2%) + BA @50ppm) (10.83days) and lowest (9.12 days) was recorded in T_{22} (distilled water) among different pulsing solutions.

Among the interactions longest vase life (11.91 days) was recorded in the treatment combination of M_6T_{18} (Module-VI with Sucrose (2%) + $Al_2(SO_4)_3$@ 200ppm) followed by the treatment M_6T_{12} (Module-VI with Sucrose (2%) + BA @50ppm) (11.10 days) and the lowest days (8.69 days) was recorded in the treatment combination M_1T_{22} (Module-I with distilled water).

Holding solutions. Vase life of *Murraya* was significantly influenced by the holding treatments (A), but non-significant with modules (B) and interactions (A × B) (Table 3).

Table 2: Effect of pulsing solution on vase life in different modules of *Murraya exotica.*

	Treatments (A)	Vase life (Days)						
		Modules (B)						
		M_1	M_2	M_3	M_4	M_5	M_6	Mean
T_1	BA (25ppm)	10.24	10.41	10.52	10.71	10.78	10.85	10.59
T_2	BA (50ppm)	10.34	10.61	10.74	10.85	10.93	10.99	10.74
T_3	GA_3 (25ppm)	9.02	9.08	9.14	9.30	9.40	9.48	9.24
T_4	GA_3 (50ppm)	8.02	8.13	9.25	9.33	9.40	9.51	8.94
T_5	8-HQS (100ppm)	9.13	9.28	9.42	9.50	9.56	9.67	9.43
T_6	8-HQS (200ppm)	9.00	9.05	9.21	9.32	9.41	9.48	9.25
T_7	$Al_2(SO_4)_3$ (100ppm)	9.71	9.76	9.98	10.18	10.22	10.27	10.02
T_8	$Al_2(SO_4)_3$ (200ppm)	9.71	9.83	10.00	10.23	10.32	10.40	10.08
T_9	NaOCl (50ppm)	8.73	8.91	9.06	9.20	9.31	9.41	9.14
T_{10}	NaOCl (100ppm)	8.84	8.93	9.08	9.30	9.36	9.42	9.16
T_{11}	Sucrose (2%) + BA (25ppm)	10.37	10.60	10.75	10.89	10.98	11.02	10.77
T_{12}	Sucrose (2%) + BA (50ppm)	10.38	10.71	10.85	10.92	11.00	11.10	10.83
T_{13}	Sucrose (2%) + GA_3 (25ppm)	8.77	8.99	9.13	9.34	9.43	9.51	9.20
T_{14}	Sucrose (2%) + GA_3 (50ppm)	9.04	9.22	9.37	9.47	9.52	9.61	9.37
T_{15}	Sucrose (2%) + 8-HQS (100ppm)	9.78	9.98	10.15	10.33	10.42	10.48	10.19
T_{16}	Sucrose (2%) + 8-HQS (200ppm)	10.00	10.13	10.39	10.51	10.61	10.67	10.39
T_{17}	Sucrose (2%) + $Al_2(SO_4)_3$ (100ppm)	10.03	10.23	10.60	10.76	10.83	10.88	10.56
T_{18}	**Sucrose (2%) + $Al_2(SO_4)_3$ (200ppm)**	**11.21**	**11.45**	**11.59**	**11.74**	**11.82**	**11.91**	**11.62**
T_{19}	Sucrose (2%) + NaOCl (50ppm)	9.04	9.34	9.59	9.99	10.07	10.16	9.70
T_{20}	Sucrose (2%) + NaOCl (100ppm)	9.03	9.22	9.44	9.63	9.72	9.81	9.48
T_{21}	Sucrose (2%)	9.21	9.49	9.71	9.86	9.94	10.00	9.70
T_{22}	Control (Distilled water)	8.69	8.89	9.07	9.26	9.35	9.46	9.12
	Mean	9.47	9.65	9.87	10.03	10.11	10.19	
		A	**B**	**AXB**				
	SE (m)±	0.314	0.164	0.770				
	CD (5%)	0.876	0.457	NA				

M_6- Spacing - 210cm × 210cm; Pit size - 60 cm^3; FYM - 25Kg/pit; Basal fertilizer dose - N:P_2O_5: K_2O @ 40:40:40 g /plant; Water soluble fertilizer- NPK 19:19:19@0.2% and BAP- 150 ppm

Table 3: Effect of holding solution on vase life in different modules of *Murraya exotica.*

	Treatments (A)	Vase life (Days)						
		Modules (B)						
		M_1	M_2	M_3	M_4	M_5	M_6	Mean
T_1	NaOCl (25ppm)	8.48	8.69	8.91	9.06	9.23	9.33	8.95
T_2	NaOCl (50ppm)	8.54	8.71	8.85	9.02	9.22	9.31	8.94
T_3	$Al_2(SO_4)_3$ (200ppm)	9.66	9.82	9.91	10.03	10.16	10.24	9.97
T_4	$Al_2(SO_4)_3$ (300ppm)	9.41	9.60	9.78	9.95	10.07	10.19	9.83
T_5	Citric acid (200ppm)	8.78	9.01	9.22	9.41	9.59	9.78	9.29
T_6	Citric acid (300ppm)	8.55	8.82	9.03	9.19	9.41	9.55	9.09
T_7	Sodium Benzoate (100ppm)	10.01	10.25	10.56	10.72	10.91	11.02	10.57
T_8	**Sodium Benzoate (150ppm)**	**10.31**	**10.58**	**10.70**	**10.81**	**10.96**	**11.12**	**10.74**
T_9	Sucrose (2%) + NaOCl (25ppm)	9.05	9.37	9.61	9.79	9.92	10.10	9.64
T_{10}	Sucrose (2%) + NaOCl (50ppm)	9.00	9.31	9.52	9.65	9.87	10.02	09.56
T_{11}	Sucrose (2%) + $Al_2(SO_4)_3$ (200ppm)	9.43	9.70	9.85	10.03	10.21	10.32	09.92
T_{12}	Sucrose (2%) + $Al_2(SO_4)_3$ (300ppm)	10.08	10.34	10.52	10.71	10.85	11.00	10.55
T_{13}	Sucrose (2%) + Citric acid (200ppm)	9.69	9.83	10.06	10.17	10.33	10.49	10.09
T_{14}	Sucrose (2%) + Citric acid (300ppm)	9.76	10.04	10.30	10.43	10.55	10.69	10.29
T_{15}	Sucrose (2%) + Sodium Benzoate (100ppm)	9.44	9.77	10.00	10.12	10.28	10.36	09.99
T_{16}	Sucrose (2%) + Sodium Benzoate (150ppm)	9.91	10.12	10.36	10.52	10.70	10.81	10.40
T_{17}	Sucrose (2%)	8.42	8.71	8.97	9.09	9.23	9.37	08.96
T_{18}	Control (Distilled water)	8.14	8.69	8.87	8.99	9.17	9.30	08.86
	Mean	9.24	9.52	9.72	9.87	10.03	10.16	
		A	**B**	**AXB**				
	SE (m)±	0.310	0.179	0.760				
	CD (5%)	0.866	0.500	NA				

M_6- Spacing - 210cm × 210cm; Pit size - 60 cm^3; FYM - 25Kg/pit; Basal fertilizer dose - $N:P_2O_5$: K_2O @ 40:40:40 g /plant; Water soluble fertilizer- NPK 19:19:19@0.2% and BAP- 150 ppm

Among the different modules the longest vase life (10.16 days) of leaves was recorded in Module VI followed by Module V (10.03 days) and shortest in Module I (9.24 days).

The longest vase life (10.74 days) was recorded in T_8 (Sodium Benzoate@150ppm) followed by T_7 (Sodium Benzoate@100ppm) (10.57 days) and lowest (8.86 days) was recorded in T_{18} (distilled water) among different holding solutions.

Among the interactions longest vase life (11.12 days) was recorded in the treatment combination of M_6T_8 (Module-VI + Sodium Benzoate (150ppm)) followed by the treatment M_6T_7 (Module-VI + Sodium Benzoate (100ppm)) (11.02 days) and the lowest days (8.14 days) was recorded in the treatment combination M_1T_{18} (Module-I + distilled water).

DISCUSSION

Pulsing solution containing Sucrose (2%) + $Al_2(SO_4)_3$ (200ppm) resulted long vase life of foliage followed by solution containing Sucrose (2%) + BA (50ppm) in module VI. Whereas holding solution containing Sodium Benzoate (150ppm) showed long vase life of foliage followed by Sodium Benzoate (100ppm) in module VI.

The longer vase life might be due to optimum availability of nutrients and higher level of potash. Since, potash enhances the synthesis metabolism and translocation of carbohydrates, synthesis of protein with rapid cell division and differentiation, which results in better postharvest life of flowers (Pal and Kumar 2004). Sodium benzoate possesses antimicrobial properties and this can be the cause of vase life extension of Murraya twigs. Sodium benzoate as an antifungal compound reduces microorganism's activity and bacterial contamination in vase solution (Oraee *et al.*, 2011).

Aluminium sulphate ($Al_2(SO_4)_3$), an antimicrobial compound has been recommended in commercial preservative solutions for increasing vase life of several cut flowers (Ichimura *et al.*, 2006). Vase life of twigs treated with aluminium sulphate in combination with sucrose was longer as compared to control. This might be attributed to antimicrobial property of aluminium sulphate which acidifies the vase solution, diminishes the microbial growth and enhances water uptake (Hassanpour *et al.*, 2004). Similar results were observed in lilium by Anil *et al.* (2016) and in rose by Maryam *et al.* (2012).

Supplementation of sucrose in the vase solution increased the carbohydrate level in the plant tissue, which helped to carry out metabolic activity thereby extending longevity of twigs.

CONCLUSION

From the present study, it can be concluded that twigs treated with pulsing solution containing sucrose (2%) + $Al_2(SO_4)_3$ (200ppm) and holding solution containing sodium benzoate (150 ppm) exhibited longest vase life irrespective of all the modules of *Murraya exotica*.

FUTURE SCOPE

Need to study about the response of low cost and eco-friendly pulsing and holding solutions for extending the vase life of cut foliages of *Murraya exotica* which will be beneficial to the farmers.

Acknowledgement. I express my sincere gratitude to Dr. S. K. Palai, Dr. Sashikala Beura, Dr. Pradyumna Tripathy, Dr. P. K. Samant, Sadhna Swastika and all other faculty members of Department of Floriculture and Landscaping, OUAT, Bhubaneswar for support and guidance to carry out this research study.

Conflict of Interest. None.

REFERENCES

Anil, K. S., Asmita, Anjana, S., Pal, A. K. and Kalyan, B. (2016). Effect of sucrose and aluminium sulphate on postharvest life of Lilium cv. Monarch. *Journal of Hill Agriculture*, *7*(2), 204-208.

Hassanpour, A. M., Hatamzadeh, A. and Nakhai, F. (2004). Study on the effect of temperature and various chemical treatments to increase vase life of cut rose flower "Baccara". *Agricultural Science Research Journal of Guilan Agriculture Faculty*, *1*(4), 121-129.

Ichimura, K., Taguchi, M. and Norikoshi R. (2006). Extension of the vase life in cut roses by treatment with glucose, isothiazolinonic germicide, citric acid and aluminium sulphate solution. *Japan Agricultural Research, 40*(3), 263-269.

Maryam, S., Ahmad, K., Younes, M. and Roohangiz, N. (2012). Study on the effect of aluminium sulfate treatment on postharvest life of the cut rose 'Boeing' (*Rosa hybrida* cv. Boeing). *Journal of Horticulture, Forestry and Biotechnology*, *16*(3), 128-132.

Matu, E. N. (2011). *Murraya paniculata* (L.) Jack in Plant Resources of Tropical Africa: Medicinal plants, PROTA, Wageningen, Netherlands, *11*(1).

Nair, S. A., Usha Bharathi, T. and Sangama (2017). Influence of Light Intensity and Seasonal Variations on Yield and Quality of Selected Cut Foliage Crops. *International Journal of Current Microbiology and Applied Sciences, 6*(12), 1984-1994.

Oraee, T., Asgharzadeh, A. and Kiani, M. (2011). Proc. 7th Horticulture Science Congress, pp 2451-2453.

Pal, A. and Kumar, S. (2004). Response of floral preservatives on postharvest quality of gladiolus spike cultivar 'Pink Friendship'. *Advances in Plant Science*, *17(*2), 529-532.

How to cite this article: Ruchita Panda, Siddharth Kumar Palai, Sashikala Beura, Pradyumna Tripathy, Prasanna Kumar Samant and Sadhna Swastika (2022). Vaselife Studies of Cut Foliages of *Murraya exotica*. *Biological Forum – An International Journal, 14*(4a): 822-825.